

MAR 1 1967

Athabasca Adventure

PUBLISHED BY GREAT CANADIAN OIL SANDS LIMITED, EDMONTON, ALBERTA—JULY, 1966

WESTERN WEEK



Oil Sands Plant Offers Career Jobs!

THE HUGE INDUSTRIAL COMPLEX these construction men are building is unlike any other. It is the world's first plant for commercial production of oil from the famed Athabasca Oil Sands—a unique achievement for Alberta and all of Canada. The vast Athabasca deposits, one of the Nation's most valuable resources, assure plentiful supplies of oil. And to Alberta, the Great Canadian plant assures a vigorous new industry and hundreds of challenging new jobs. Here may be a chance for you to get in on the ground floor of Canada's newest industrial enterprise!

ON THE INSIDE...

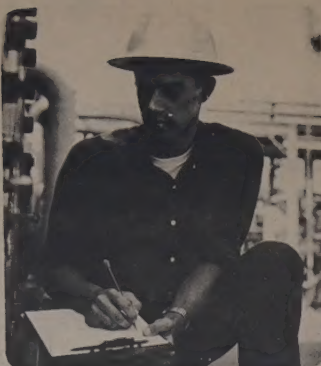
New Jobs with GCOS.....	2
Construction moves ahead.....	3
How oil is recovered.....	3
Life in Fort McMurray.....	5
Oil sands pose tough challenge.....	6
Benefits 'package' for employees.....	7
Job application form.....	7
Sun Oil in Canada.....	8

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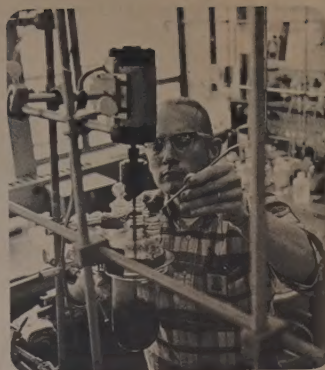
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Equipment operators will man the heavy machinery and vehicles used in mining.



Plant technicians check operations of process units.



Laboratory technicians test quality of plant output.

Warehouse employees control stocks of equipment and supplies, play vital role in keeping huge plant running.



Put yourself in the picture handling jobs like these!

OPPORTUNITY AND CHALLENGE!

These are the key words describing jobs opening up for young men in the vast oil sands mining and processing complex of Great Canadian Oil Sands Limited now moving toward completion 20 miles from Fort McMurray.

When the plant goes into operation next year it will provide permanent employment for some 700 people.

For them, working with Great Canadian will provide broad opportunities for rising incomes, for learning new skills and for growing apace with a young company. And hand-in-

hand with those opportunities goes the challenge of getting in on the ground floor of Canada's newest industrial enterprise, and of contributing to a project destined to play a major role in meeting the growing energy needs of the world.

Specifically, employment with Great Canadian offers these major advantages:

- Good starting salaries.
- Comprehensive training in new skills at the Company's expense.
- Opportunities for job advancement in line with individual performance.
- A broad employee benefits programme offering many advantages to workers and their families.
- Availability of modern housing in a family town offering city conveniences.

Variety of Jobs Open

Individual job openings with Great Canadian provide a wide range of work opportunities. Included, for example, are the following:

- Operators to man mining machinery and equipment and oil extraction facilities;
- Technicians to staff the control rooms of processing units, and to work in other areas of plant operations;
- Maintenance men for a variety of jobs;
- And clerical people to handle various types of office work.

Fill out and return the form on page 7 if you would like to be considered for a job with Great Canadian Oil Sands.

In filling these jobs, Great Canadian will be looking for young men who want to build careers with the Company—young men who are mechanically inclined and who like the easy informality of plant operations work. Both high school graduates and those with a grammar school education can meet the Company's requirements. Specialized training in plant operating procedures and other duties will be provided by the Company.

Benefits Package Offered

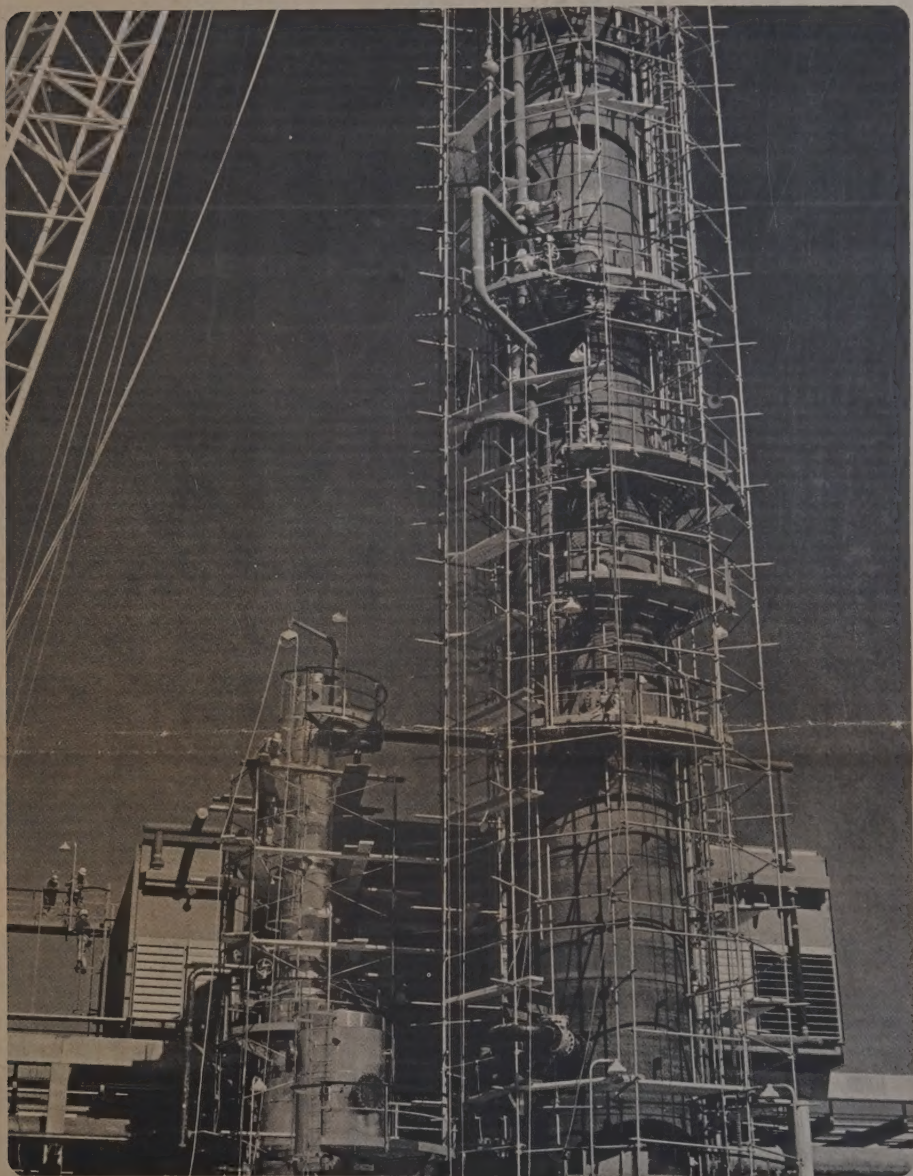
Men filling these and other jobs for Great Canadian will enjoy participation in a broad-scale employee benefits programme. Included

continued on page 7



Plant operators will automatically regulate complex extraction and processing units from control rooms like this one rapidly nearing completion.

Construction crews push huge project past 50% mark



Tall tower rising skyward is part of processing complex that will convert bitumen from Athabasca deposits into high-quality synthetic crude oil.

TWENTY MILES FROM Fort McMurray along the Athabasca River 2,000 construction workers, racing against time, are transforming a small piece of Alberta into a huge, complex and first-of-its-kind oil sands processing plant.

By mid-1966, the plant and related facilities were more than 50 per cent completed. And Canadian Bechtel's construction crews were stepping up the pace as they pushed the pioneering venture of Great Canadian Oil Sands Limited toward a September 30, 1967, deadline.

On that date, Great Canadian's facilities will be in full operation producing synthetic crude oil from the Athabasca sands. The plant's output will total 45,000 barrels of oil daily.

Right now, the site of the world's first commercial oil sands processing project looks like a beehive. For both mine preparation and construction of extraction and other processing facilities have been advancing steadily since the project got under way in late 1964.

Large Mining Area Cleared

More than 2,000 acres of mining area on the 4,000-acre lease have been cleared.

Also, over 3,000,000 cubic yards of overburden have been removed from the initial mining area and used for construction of a dike that will enclose the washed sands during the first few years of operations.

Fabricated parts for the first of two giant excavators that will dig the sands have been received from West Germany. The excavators will be assembled at the plant site. It is expected that the first excavator will be ready for test operation by March 1, 1967, so that experience can be gained with winter mining conditions prior to the plant start-up.

The excavators, each capable of digging up to 100,000 tons of sand daily, will dump the sand on high-speed conveyor belts which will move it to the extraction plant. Foundations and the steel framework for the conveyor system are now under construction.

Extraction Unit Work Advances

Work on the facilities which will extract oil from the sands is moving ahead steadily. A large, reinforced concrete building housing the final phase of the extraction process was erected last winter inside a giant inflated plastic bubble. Many unusual construction methods have been employed, often chosen simply out of regard for the comfort and safety of construction workers.

Most of the process vessels and other equipment is in place for the bitumen recovery facilities, and piping and electrical work are going ahead throughout the plant area.

A unit that will extract 3,000 tons of coke daily from the bitumen is moving toward completion. The unit's six giant coking drums are already in place. Measuring 94 feet in height and 26 feet in diameter, the silo-like drums are the largest of their type ever constructed. They were fabricated at the plant site and moved into position by a huge gantry.

Storage Tanks Near Completion

Construction of steel tankage that will hold over 1,000,000 barrels of oil is virtually completed. The steam and power plant at the site will generate enough electricity to supply a residential city of 50,000 people. A 350-foot

continued on page

BRILLIANT ANSWER SOLVES 'INCREDIBLY TOUGH' RIDDLE OF ATHABASCA SANDS

LIKE ALL BRILLIANT INVENTIONS, the process for separating oil from the Athabasca sands is basically a simple idea. It can be expressed in three words: hot water flotation. But achieving that simplicity was incredibly tough. The heart of the problem was designing commercial-scale facilities to put the idea to work.

Many Technical Answers Required

And beyond freeing the heavy oil or bitumen, innumerable technical answers had to be found for the whole sequence that starts with mining enormous quantities of the raw tar sand from the earth. Large-scale, low-cost methods had to be worked out for processing the tarry goo to remove impurities and turn it into a liquid capable of being

pumped through pipelines.

In a nutshell, here is how the mining and processing will work:

Giant Excavators Dig Sands

Two giant bucket-wheel excavators, developed in Germany for coal mining, will take great gulps of oil sand and spew it onto high speed conveyor belts. It will be whisked at a speed of 1,000 feet a minute to the extraction plant. In the beginning, the conveyors will carry the raw sand only a short distance. As mining progresses, the belts will transport it as much as three miles.

Hot Water Process Extracts Oil

At the extraction plant, hot water, steam and certain chemicals will be added to the

oil sands. This will raise the temperature and help break down any lumps. More hot water will then be added to thoroughly wet each grain of sand, and the bitumen will rise to the surface as froth and be scraped up by large revolving blades.

Final extraction, to remove minute traces of water and fine clay particles, will produce some 60,000 barrels daily of pure bitumen about the consistency of frozen molasses.

Coke and Sulphur are Produced

Next the bitumen will move to a processing area where some 3,000 tons of coke and 300 tons of sulphur will be produced daily. The coke will fuel a large steam and power plant, generating enough electricity for a residential town of 50,000 and producing

hot water for the separation plant.

The final product will be a high-gravity, sulphur-free synthetic crude oil. It will be moved to Edmonton through Great Canadian's new 266-mile pipeline, and then be piped on to refineries.

Sun Oil Company Limited, Toronto, the parent company of Great Canadian, will purchase 75 per cent of the output, and Shell Canada Limited the remainder.

Clean Sand to be Used for Fill

What about the thousands of tons of clean, white sand spewing forth from the extraction plant each day? Within a few years, it will fill a 500-acre diked area. After that, it will be returned to the mined-out areas and the surface will be reforested.



Giant drums (at right) will extract 3,000 tons of coke daily from bitumen.

Project passes 50% completion mark

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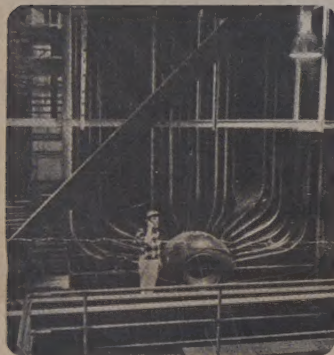
chimney has been erected, and three boilers are being installed. Production of steam and electric power is expected to begin late this year.

The 266-mile pipeline that will deliver Athabasca oil to Edmonton is scheduled for completion this summer. When the line is finished, GCOS expects at first to operate it in reverse from Edmonton to the plant site to provide fuel for construction equipment and boilers and to handle the start-up of processing units.

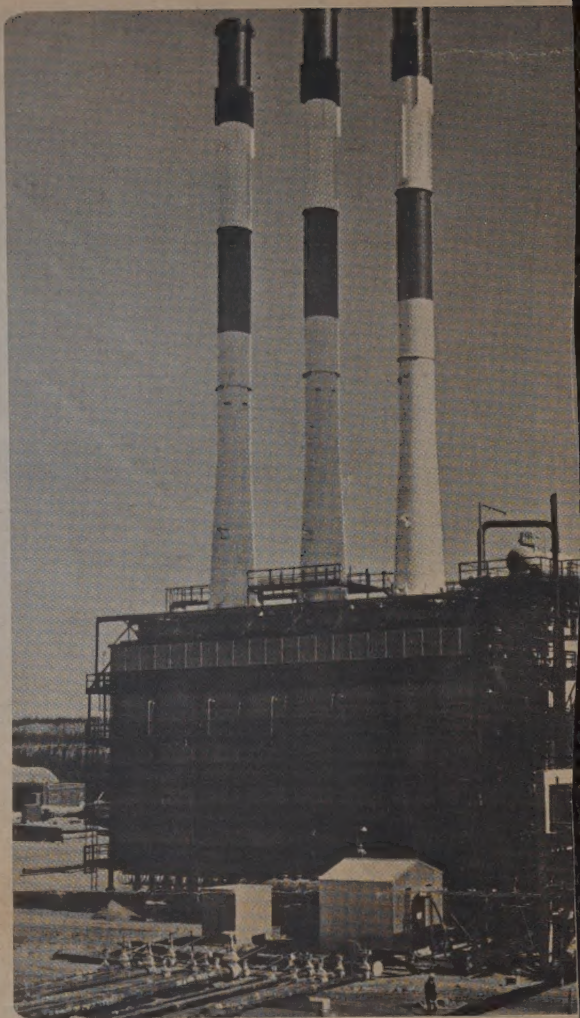
Road and Bridge Completed

Among related activities, GCOS earlier had completed an all-weather road from the plant site to a point on the Athabasca River opposite Fort McMurray. A bridge across the river linking this road with the town was opened last year to provide the first overland route between town and plant site. The bridge was built at a cost of \$3,300,000. GCOS paid slightly more than one-half of the cost, then turned the bridge over to the Alberta Government.

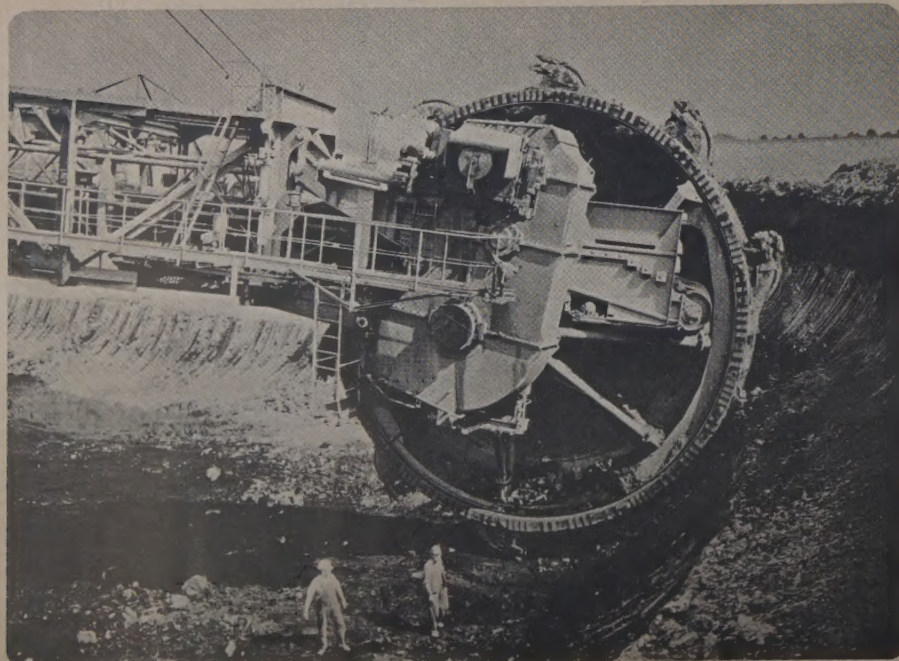
Engineering, design and construction of the oil sands project is being handled by Canadian Bechtel Limited of Toronto.



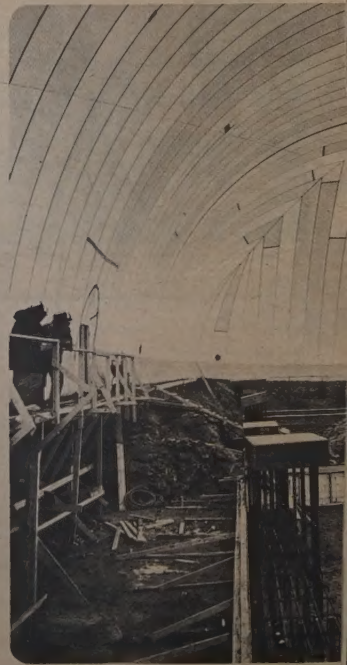
Inside view of one of three huge boilers in power plant.



Towering stacks rise from reformer furnace which produces hydrogen for treating liquids from



Giant bucketwheels, measuring 30 feet in diameter, scoop up oil sand, dump it on high-speed conveyor belt for movement to extraction facilities.



Extraction plant construction moved ahead during winter

McMurray: Family life in modern town

FOR NEARLY A CENTURY Fort McMurray has been waiting for something big to happen. Now it has.

After decades of just getting along, this Alberta community today is a modern, fast-growing town.

And the reason has been there all the time. Oil. A fabulous deposit of just about the most ornery form of oil known to man, right on its doorstep.

Over the years, the people of McMurray (as they call it) hoped the day would come when the secret of the Athabasca oil sands would be unlocked. At times, hope would burn brightly on a rumor or a report or an actual try at wresting a usable product from the thick, sticky geological puzzle.

Then the rumors would fade or the tries end in failure, and Fort McMurray almost lost hope altogether of becoming more than a handy transportation link to the far North.

Early Transportation Centre

It seemed that its location—the reason for its existence—would in the end defeat it. Strategically situated at the junction of the Athabasca and Clearwater rivers, Fort McMurray was a natural staging area for freight moving to the far northwest. It eventually became a terminus of the 300-mile Northern Alberta Railroad from Edmonton—and the start of a 1,700-mile barge route down the Athabasca and Mackenzie rivers to the Arctic Ocean.

But McMurray's access to the outside world was limited to railroad and infrequent air transportation.

Then came the Great Canadian Oil Sands project. The old Fort McMurray was no more.

Two years ago it was mainly one dusty street, a single clapboard hotel, a lonely service station, a few frontier stores, a collection of mostly unappointed shacks and log cabins.

Variety of New Facilities Added

Today it has:

- two modern hotels and three new motels
- two shopping centres with 23 business places
- three supermarkets
- several new apartment buildings
- two trailer courts with space for 200 units
- a laundry and dry-cleaning plant
- two auto-rental agencies
- some 70 new houses
- a nine-room addition to its public school
- a new post office
- a bowlingdrome, a curling rink and an indoor ice-skating rink
- a theatre
- a new hospital
- an adult vocational school
- three new service stations

More Coming Within Next Year

But the transformation is just beginning. New facilities to be added within the next year include:

- hundreds of modern homes
- more new apartment buildings
- a score of new retail shops
- a new Olympic-size swimming pool
- a new community waterworks
- a new town hall

This steady growth and excitement also reflects the hundreds of people—construction workers, engineers, executives—now crowding into McMurray. Three years ago, its population was about 1,100. At the beginning of this year, it had risen to 2,200. When the GCOS plant begins operations next year, it is estimated that this figure will rise to over 4,500.

Town Has Modern Airport

And no longer is it isolated. Fort McMurray's modern airport is bustling. A highway to Edmonton, with a link to Lac La Biche, was opened in March of this year. The economics of transportation into the area are being radically altered.

Today, the framework of a model community is emerging. Bulldozers are pushing the forest's edge back farther to make room for a new subdivision to embrace 500 homes in the \$12,000 to \$24,000 range. The town administration, aided by a higher tax base and provincial government loans and grants, plans a major street-paving program, installation of a water purification plant and new parks and recreation sites. A \$3 million bridge now spans the broad Athabasca River, linking the town and plant site. And progress at GCOS also

means a steady flow of traffic—largely GCOS personnel—for Pacific Western Airline's two daily round-trip flights between Edmonton and the \$168,000 Fort McMurray air terminal. In addition, a new \$450,000 vocational training centre has been operating so successfully that it is being doubled in size.

All this has had a decided effect on the family life of Fort McMurray residents—and the impact will be even greater on those who will come later. Even now many benefits are available.

• Churches—Baptist, Gospel Assembly, Roman Catholic, Anglican and United.

• Service Clubs—Elks, Kiwanis, Royal Canadian Legion and Chamber of Commerce. Women may join the Imperial Order Daughters of the Empire. Children's groups include Junior Foresters, Boy Scouts, organized baseball teams and various church organizations.

• Medical—a new ultramodern hospital equipped with the latest facilities.

• Transportation—daily air service between Fort McMurray and Edmonton, railroad transportation connecting the two points, and the new road connecting Fort McMurray and Edmonton.

continued on page 6



Progress-minded Peter Pond School has fine teaching staff, modern classrooms, ample play area.



Modern hospital has top staff, latest equipment.



Supermarket offers wide variety of merchandise. Restaurants have varying menus, pleasing decors.



New homes provide convenience, gracious living.



oker to remove sulphur, other impurities.



hs under protection of giant plastic bubble.

Family town offers modern facilities

continued from page 5

- Banking—new buildings house offices of several major banks
- Variety stores and services—two new shopping centres offer such shops as a bakery, supermarkets, laundry and dry cleaning, drug stores, hardware, service stations, a department store and a beauty salon.
- Entertainment—bowling lanes, a curling rink, a skating rink, a theatre are recent additions to the recreational scene. Colourful dining rooms and cocktail lounges serve a wide variety of foods and beverages.
- Community services—law enforcement is a responsibility of the Royal Canadian Mounted Police, while a volunteer fire department provides round-the-clock protection.

Schools Are Modern, Expanding

Finally, schools—an essential ingredient to the modern community. Children are educated in an up-to-date school system with the same high-quality facilities as the best city schools. Modern home economics and vocational training courses are designed to teach the early teenage children to work with their hands. Capable and dedicated teachers also probe the alert children's minds with problems in science, mathematics and language, to prepare them properly for higher education in college or university.

An expansion programme at the Peter Pond Public School now makes it possible to accommodate twice as many pupils as it did previously.

St. John's Separate School has also added a new wing to its facilities, providing a wider range of courses for children from the first through 12th grades.

An Adult Vocational School has recently opened and offers pre-employment courses in construction trades, heavy equipment operation and basic training in various other skills.

And Fort McMurray will continue to grow. When the plant begins operations in 1967, GCO's operating employment is expected to total 450, with another 250 men needed for plant maintenance work.

Nor will it be a short-lived prosperity. Petroleum experts estimate that final oil recovery from the Athabasca deposit will run as high as 300 billion barrels—enough to meet the needs of the United States and Canada for over 65 years on the basis of today's demand for oil.

With that kind of economic future, there is an understandable undercurrent of optimism in

Fort McMurray today. But community leaders, recognizing that their town's future is tied primarily to the oil venture, are planning wisely. They have known hard times—and they want no more. With prosperity now at hand, they realize they must plan carefully to reap full advantage from this long-awaited development.

McMurray Has Promising Future

Looking to tomorrow, Fort McMurray's city fathers are seeking out new and different projects to lend diversity to McMurray's present main asset. And everywhere people are talking of still more conveniences of big-city living.

The future of course won't be smooth. New wealth can create big problems. But McMurray—its residents and leaders—recognize these facts of life.

To them, and to the thousands of new McMurrayites, the future is bright. There is nowhere to go but up.

Recovering elusive oil of Athabasca posed tough challenge

Reprinted from the Petroleum Gazette, quarterly publication of the Petroleum Information Bureau (Australia)

IN THE NORTHEASTERN PART of the province of Alberta, some 250 miles north of Edmonton, 626 billion barrels of oil are estimated to be contained in the Athabasca oil sands, which extend over more than 30,000 square miles. These reserves of "oil in place" are equal to half the world's known "conventional" oil accumulations, recently estimated at 1.3 trillion barrels.

The existence of these oil sands was known almost a century before Colonel Drake drilled his historic well at Titusville, Pennsylvania, in 1859, and neither painstaking exploration nor patient drilling was necessary to find them. However, before Australian oil-seekers allow envy of Canada to blunt their own efforts, they should consider the history, nature, and sheer frustration of the Athabasca oil sand deposits.

Sands First Mentioned in 1788

The first recorded mention of the sands was in 1788 when Peter Pond, a fur trader, travelled to the junction of the Athabasca and Clearwater rivers. He reported that he found Indians using a "sticky substance oozing from the river banks to waterproof their canoes".

The Athabasca oil sands consist of unconsolidated oil-bearing sands, interspersed with clay and shale of varying thickness. In texture the sand is soft, sticky, and loose, not unlike plasticine. It has been accurately and picturesquely likened to a thorough mixture of molasses and coffee grounds. A thin film of oil clings to each grain of sand.

Deposits of oil sand are exposed along the Athabasca River for about 100 miles north of Fort McMurray; sometimes the banks are cliffs of oil sand 150 feet high. However, more than 90 per cent of the sands are not amenable to strip, or open cut mining, because of excessive overburden which can be as much as 2,000 feet thick. The thickness of the sands themselves varies considerably but is rarely more than 200 feet.

Raw Oil Must be Upgraded

The oil contained in the Athabasca sands is thick and sulphurous, and is of poor quality. It must be upgraded to form synthetic crude oil before it can be marketed. Although extraction of the sands on or near the surface has presented no great problem—it is essentially a mining operation—the difficulties of separating the oil from the sand and subsequently upgrading it have retarded development.

The complexities of these operations, and the discoveries of relatively easily recoverable conventional oil accumulations elsewhere in the world, have been responsible for the apparent neglect of the sands until the 1950's.

Several schemes have been proposed to render the oil recoverable by well drilling, but the most immediately attractive method is to mine by open cut the deposits which lie close to the surface or which outcrop. However, there is considerable research still in progress on both mining and *in situ* methods of production.

No official interest was taken in the Athabasca sands until a century after Peter Pond had noted them, when the Canadian Geological Society arranged for a geological survey of the area and confirmed the extent to which the oil sands outcropped along the Athabasca River. In 1897 the sands were drilled for the first time. Since then more than 1,800 holes have been drilled, of which not one could be turned into a productive well. Nevertheless, these wells provided much information, enabling a reasonably accurate assessment of the amount of oil in place.

Oil sands by their very definition are "highly viscous hydrocarbon material not recoverable through a well by ordinary production methods". From the turn of the century petroleum engineers and chemists were to be tantalised by the problems of how to separate the heavy oil from the sand to which it clings.

Attempts to solve the problems of separation began in earnest in 1919, when the Alberta Research Council was formed. A hot-water separation process was demonstrated on pilot-plant scale in 1923, and a year later a larger plant was built. Oil produced in this experimental plant was sent to Edmonton and used as a road-making material. Some Edmonton roads are still paved with bitumen from the Athabasca sands. However, no economically feasible technique was devised at that time for commercial exploitation.

In the early 1930's a small plant was built at Bitumount by the International Bitumen Company which produced some crude products. It was later taken over by Oil Sands Limited, later to become Great Canadian Oil Sands.

In 1936 Abasand Oil Limited was formed and built a plant to test the hot-water process. A product similar to diesel oil was produced from the oil sands and was supplied for some time to the Lake Athabasca area. The plant was dismantled in 1941 and rebuilt in a modified form. However, it never again operated satisfactorily and it was almost entirely destroyed by fire in 1945; the refining section escaped the fire and was sold to Excelsior Refineries Limited.

Separation Plant Built in 1944

During the depression research into the problem was suspended, but in 1944 a hot-water separation plant was built at Bitumount by the Provincial Government. It was subsequently bought by Can-Amara Oil Sands Development Limited and Royalty Oil Company Limited. A centrifugal separation process was tested and found to be successful. Four years later the two companies announced a plant and pipeline project to cost \$50 million, but nothing came of the proposals. Meanwhile the Bitumount plant was also destroyed by fire.

Interest in the oil sands grew rapidly in the early 1950's aroused partly by the 1st Tar Sands Conference in Canada in 1951, and partly by the Abadan crisis in the Middle East. Before the decade closed much of the oil sands area had been leased, and the race to commercial production was under way.

By this time the technical problems of mining and separation had largely been solved, but the projects proposed or tried were too small to be economic. Now large-scale projects were planned by various companies using different methods of extraction and separation, ranging from the use of high frequency sound waves to knock the oil loose to underground atomic blast.

Conventional Oil Output Boosted

Large-scale production of conventional oil began in Alberta following the discovery of the Leduc field in 1947. Capital investment in development and exploration amounted by 1962 to \$4 billion; thus any competition from the immense Athabasca reserves constituted a grave threat to the conventional industry. Because of this, the Alberta Government placed conditions on Athabasca's commercial development which created an obstacle almost as great as the technical problems now overcome.

Through the agency of Alberta's Oil and Gas Conservation Board, the Government in

October, 1962, set a limit on the amount of oil to be produced from the Athabasca sands, which in consequence limited the economic feasibility of the projects put forward by various oil companies.

Production from Athabasca sands was so regulated that it would supplement and not replace conventional oil. Initially the restriction was to 5 per cent of the total demand for Alberta crude oil, and further expansion was to be related to the operating ratio of the conventional industry.

The Government was in an embarrassing position. In recent years about half the normal conventional production had been shut in for lack of markets and the \$4 billion industry obviously needed some protection. It was nevertheless galling to find that just as technology was making it possible to exploit commercially the vast oil sands deposits—one of Canada's greatest natural assets—economic factors made it necessary to limit production.

Research Initiated at Mildred Lake

In 1957 two companies began a joint research project in the Mildred Lake area of the Athabasca sands. After Royalty had obtained numerous core samples by extensive drilling, Cities Service undertook laboratory studies of extraction methods. A large-scale pilot plant was built at Mildred Lake and in August, 1959, it began to mine, extract, and process oil sands on the companies' lease.

Oil Richfield Oil Corporation had become a partner in the venture at the end of 1958, and in September 1959 Imperial Oil Limited joined the group.

Richfield had previously proposed a method of separation by subterranean atomic blast. A 9-kiloton atomic device was to be detonated 20 feet below the oil sands to form a subterranean cavity about 230 feet in diameter. As the sand fell into the cavity, heat released by the explosion was expected to render the oil mobile (and possibly even upgrade it) so that it could be recovered by using conventional well-drilling methods. Because of the current international moratorium on atomic explosion tests the project was never given official sanction.

Investigations into two other *in situ* methods of production were carried out in 1960. Pan American Petroleum Corporation proposed a system of air injection and underground combustion to loosen oil from the sands for conventional production. Shell developed a method in which steam injection into the sands provides a source of heat. As the underground temperature rises an oil-water emulsion is recovered by drilling a well. It is estimated that by this method more than 50 per cent of the oil in place can be recovered.

Of the processes involving mining and separation, two were seriously considered—the original hot-water method and a cold-water process—and three are still in the laboratory stage.

The cold-water process, developed by the Mines Branch of the Department of Mines and Technical Surveys in Ottawa, was discarded eventually in favour of the hot-water process developed originally by the Alberta Research Council.

Great Canadian Submits Proposal

In 1960 Great Canadian Oil Sands Limited submitted a proposal to the Oil and Gas Conservation Board to produce 31,500 barrels a day from Lease No. 4 by the hot-water process. The application was rejected as premature. By this time 50 per cent of conventional oil production was shut in, and the government was not anxious to encourage

a new prolific source of oil. However, the company was told it could re-submit its application in two years time.

Within that time a challenge to the Great Canadian proposal came from two larger companies—Shell Canada and Cities Service. Shell proposed a \$260 million, 100,000 barrels per day steam injection project; Cities Service, Athabasca, Inc. (Cities Service, Imperial Oil Limited, Richfield Oil Corporation and Royalty Oil) having, by August, 1961, proved its process successful by pilot-plant production of 3,000 barrels per day proposed a 100,000 barrels per day scheme, to cost \$356 million.

The Conservation Board ruled in favour of the Great Canadian proposal in September 1962, under the strict policy of limiting Athabasca production to 5 per cent of the total demand for Alberta oil.

However, Great Canadian, its proposal accepted, ran into financial difficulties. New taxes, including an 11 per cent sales levy on construction and plant equipment, and a higher royalty, raised the capital and operating costs considerably. The original scheme, to cost \$124 million for a 31,500 barrels per day project, became uneconomic, and Great Canadian could not raise the required capital.

Sun Offers Financial Backing

Sun Oil Company, of Philadelphia, already a major partner in the Athabasca Lease No. 4 (Abasand Oil) holds the remaining 25 per cent of the lease and a committed purchaser of 75 per cent of Great Canadian's proposed output (Shell was to buy the remainder), came forward to offer \$67,500,000 in equity capital and to guarantee the rest of the capital required.

One of the conditions of Sun Oil's participation was that output be raised to 45,000 barrels per day, which increased the capital required to \$191 million. Although the enhanced output was 5 per cent of Alberta's conventional production, the revised proposals were accepted by the Conservation Board in February, 1964, and approved by the Provincial Government in April. The Board set September 1, 1964, as the date for the start of construction work; the plant was to be on stream by late 1967.

The addition to Canada's oil reserves will be immense. With the exception of oil-shale deposits in the USA, recoverable oil reserves in the Athabasca oil sands are greater than in any other single source. They are larger than the proved reserves in the Middle East and South America combined. There are approximately 10 other oil sands deposits in Alberta, all to the west of the Athabasca deposit. The largest is the Peace River deposit. In total they add another 85 billion barrels to the reserves of oil in place.

Alberta Sands Hold Vast Reserves

In all, Alberta's oil sands hold more than 750 billion barrels of oil, from which it is estimated that 300 billion barrels of synthetic crude could be recovered.

For more than a century, while oil companies searched the earth for petroleum, the Athabasca oil sands have been recognised as a potential source of great magnitude. It may not have been necessary to explore for them but they have nevertheless remained one of the most elusive sources. The sands and the oil locked in them lay enigmatic and tantalising while petroleum engineers sought economical ways to develop the deposits. Now at last, the Athabasca oil sands are to join conventional oilfields to make their contribution to meet the ever-growing demand for petroleum products.

Employees enjoy generous benefits, modern housing

Benefits package provides security

IN ADDITION TO GOOD PAY and opportunities to advance, Great Canadian employees and their families will enjoy the advantages of a comprehensive employee benefits programme. Included in the employee benefits "package" are:

Medical Care Programme: This programme supplements the public ward benefits of provincial hospital plans. It consists of (1) a basic plan which provides for full reimbursement for medical expenses subject to specified maximums; (2) a supplementary hospital plan; and (3) a supplementary major medical plan which provides reimbursement for virtually all medical-hospital expenses not covered under the other plans. The programme is designed to provide employees and their families with broad protection against medical expenses. Premiums are shared by employees and the Company.

Pension Plan: The primary purpose of this plan is to help employees prepare financially for their retirement. The cost of the plan is shared by employees and the Company. The plan provides a regular monthly pension during retirement years and, if a retiree elects, during the life of his wife and other depend-

ents. There are several options available to meet the needs of individual employees.

Group Life Insurance: This plan provides a measure of financial protection for the employee's beneficiary, and is intended to supplement the employee's personal insurance programme. Premiums under the plan are shared by the employee and the Company on the basis of approximately 50 per cent each. Coverage is equal to two times regular basic annual earnings.

Voluntary Accident Insurance: This insurance has been arranged so that employees may obtain personal accident insurance on a group basis, with substantial savings over individually purchased protection. Benefits under the plan are in addition to benefits received under any other Company plan, government plan or personal insurance policy. It covers any accident anywhere at any time that results in death, dismemberment, loss of sight or total disability.

Disability Insurance: This plan protects the employee against possible financial disaster should he become unable to earn a living because of illness or accident. Benefits would start after the first 180 days of disability and would be in the amount of 50 per cent of regular basic earnings (up to a maximum of \$250 per week) at the time the employee became totally disabled—either on or off the job.

Holidays: It is the policy of the Company to grant all employees nine paid holidays each year. These are New Year's Day, Good Friday, Victoria Day, Dominion Day, Labour Day, Thanksgiving Day, Christmas Day, Boxing Day and Civic Day.

Vacations: The Company will grant paid vacations to employees. After one year of service, two weeks are granted, and starting in the tenth year three weeks are given.

Recreation: By the time the plant is in operation during the latter part of 1967, there will be on location a qualified recreation staff to help plan employee and family social functions and sports activities.



In-plant first aid facilities are maintained to meet the needs of Great Canadian employees.

Plant offers steady jobs with future

continued from page 2

in the package is a generous pension plan, medical protection for employees and their families, group life insurance coverage, disability insurance, accident insurance and paid vacations and holidays.

People coming to work for Great Canadian will find that Fort McMurray is a family town offering modern community facilities. Excellent schools, new shopping centres, churches and new recreational and entertainment facilities rival the attractions of big-city living.

Too, Fort McMurray offers boating, hunting, fishing and many other recreational opportunities—and an excellent climate in which to enjoy them. Located outside the snow belt, the town gets less snow than either Calgary or Edmonton.

Good hunting and fishing areas are plentiful

in the Fort McMurray area, Gregoire Lake, a few miles south of town, is a popular picnic area and a gathering place for bathers, boaters and water skiers. Also, the town offers a new Olympic-size swimming pool, a new indoor ice-skating and hockey rink, a new curling rink and an archery club.

Looking into the future, Great Canadian promises stable employment for many years to come. The 4,000-acre lease to be mined initially will supply the new plant with raw sands for processing for some 30 years. And later, the Company may process oil sands from other leases.

In brief, Great Canadian's initial operations and future potential add up to hundreds of challenging but rewarding job opportunities for young Canadians.



Curling ranks high among recreational pastimes.



Angler tries sport of another sort near bridge.



This is one of several types of modern houses being constructed in the town of Fort McMurray.

Housing is designed for family living

PEOPLE COMING TO WORK for Great Canadian Oil Sands will find a wide variety of modern housing facilities available to them in Fort McMurray.

Some 70 new homes and 35 apartment units have been completed since Great Canadian initiated construction operations, and the pace of building is accelerating as the plant start-up date draws closer.

The area's first large housing contract, covering construction of both houses and apartments, was awarded in May, and work is now under way. Demand for 500 new houses is anticipated over the next two years, and additional contracts will be awarded shortly.

Plans for housing areas were developed by a leading Canadian architect. Parks and recreation areas will be provided, streets and sidewalks will be paved, and electrical wiring will be underground.

Great Canadian employees will have a choice of housing from several styles, including ranchers, bungalows and the latest bi-level design. All feature modern conveniences designed for pleasant living and easy housekeeping.

For those who prefer apartment living, new well-cared-for units are available.

Shopping centres featuring a variety of stores and services are convenient to both the new houses and apartments.

Career Opportunities for YOU with GCOS

Would you like to apply for a steady job... offering good pay and generous benefits... with a progressive Company... in a brand-new industry?

If so, complete the application blank below and mail it to Great Canadian Oil Sands Limited at the address shown.

Great Canadian is looking for men who would like to build a career with the Company. It is especially interested in young men who are mechanically inclined—men who enjoy working

with machinery or in plant operations. There are varied openings for vehicle and equipment operators, extraction and processing plant operators, laboratory technicians, clerks and others.

Young men with either a high school education or a grade school education can qualify. Specialized training is not required.

To get in on the ground floor of Canada's newest industrial enterprise, complete and mail the application below.

COMPLETE FORM AND MAIL TO GREAT CANADIAN OIL SANDS LIMITED

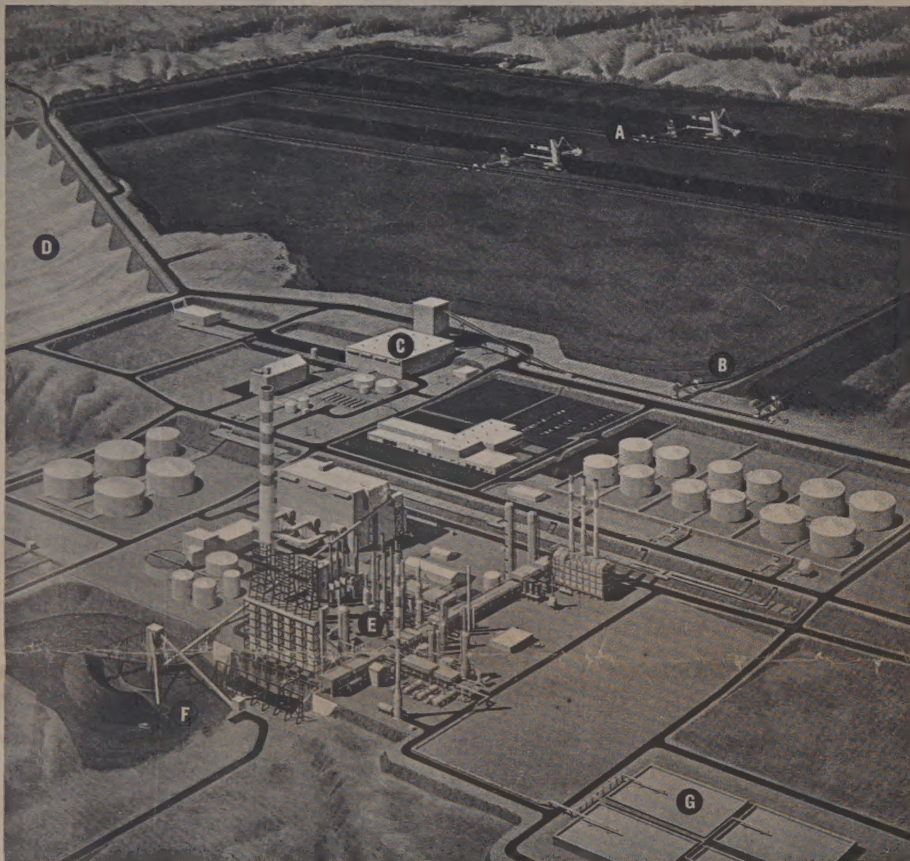
500 Royal Bank Building, Jasper Avenue and 101st Street, Edmonton, Alberta

I am interested in employment opportunities in the Great Canadian Oil Sands operations near Fort McMurray.

Date: _____ Signature: _____

(please print)		PERSONAL DATA	
Name:		Telephone Number	
Home Address:			
Date of Birth:	Height:	Weight:	
Marital status:	Number of children:		
EDUCATION			
Type of School			
Grade:			
High			
Other			
WORK EXPERIENCE			
My present occupation is: _____			
My present work location is: _____			
Check type of work you would like to do for GCOS:			
Heavy equipment operations ☐ Plant operations ☐ Laboratory ☐			
Maintenance ☐ Clerical ☐			

S-O



GCOS FACILITIES WILL LOOK LIKE THIS WHEN COMPLETED

Artist's rendering shows how Great Canadian Oil Sands Limited facilities will look when completed. Briefly, the key steps in plant operations are these:

Two mammoth bucketwheel excavators (A) will start the process by scooping out the sand in tremendous bites. Shiftable conveyors (B) will move the sand to the separation plant (C). There, oil and sand will be separated by a hot water process in which bitumen floats to the top of the water and sand settles to the bottom. The bitumen is recovered by skimming the surface with revolving wiper blades and the sand is pumped into a pond (D).

The bitumen, still too heavy and viscous, must receive further processing (E). It first enters a unit where coke is extracted, and then moves through a plant where sulphur is removed. The resulting synthetic crude oil is then made ready for shipment by pipeline.

Residue coke will be stored (F) and used to produce steam, hot water and electricity. Sulphur will be further processed (G) and prepared for commercial shipment.

Sun Oil Limited has grown with Canada since 1919

THE SUN ORGANIZATION that is investing more than \$200 million in Great Canadian's Athabasca project is no newcomer to Canada.

Sun's Canadian operations date back to 1919. In that year, Sun Oil Company Limited, a wholly-owned subsidiary of the parent Sun Oil Company, went into business selling lubricating oils in Montreal. The firm branched out into the gasoline business in the late 1920's, and has grown steadily since that time.

Marketer in Ontario and Quebec

Today Sun Limited markets automotive and industrial products in the Provinces of Ontario and Quebec, with over 950 retail outlets offering Sunoco Custom Blended motor fuels. These and other products are produced by the Company's 30,000 barrels/day refinery at Sarnia in Ontario.

Sun Limited also owns a majority interest in a 200-mile pipeline which moves gasoline and other products from Sarnia to Toronto.

Petroleum exploration and production in Canada is handled by the parent Sun Oil Company through its Calgary Production Division.

Last year this Division produced over 3,200,000 barrels of oil and 7½ billion cubic feet of natural gas in Canada.

Sun Limited Moves into Production

Sun is gradually transferring these production operations to Sun Limited as that company's financial position makes this possible. Progress was made in this direction in 1965 when Sun Limited successfully bid on some producing properties in Alberta, and completed one well as a producer.

Together Sun Limited and the Calgary Division of Sun Oil have an investment of over \$125 million in conventional petroleum operations in Canada. Combined employment totals about 900.

Sun Oil Assets Exceed \$1 Billion

The parent company, based in Philadelphia, Pennsylvania, is active in all phases of petroleum operations, and employs over 17,000 people in its Oil Division. The Company's assets exceed \$1 billion and its sales run above \$900 million annually.

The Sun organization's interest in the Athabasca sands dates back to the mid-1940's. It became directly involved in oil sand developments in 1954 when a 75 per cent interest was secured in Abasand Oils' Lease No. 4 at Mildred-Ruth Lakes some 20 miles from Fort McMurray.

GCOS Agreement Signed in 1958

In 1958, Sun and Abasand signed a contract giving Great Canadian the right to mine the sands from Lease No. 4.

Sun also agreed to purchase 75 per cent of the output of the 31,500 barrels daily plant which Great Canadian proposed to build. This proposal by Great Canadian was approved by the Alberta Oil and Gas Conservation Board in 1962.

However, subsequent engineering and other studies indicated that an increase in plant capacity would be required to offset the effect of changed economic circumstances. Key factors altering the economic picture were rising construction and operating costs and increases in taxes.

Sun Offers Financial Backing

In 1963, after Great Canadian had failed in its efforts to finance the project, Sun Oil, through Sun Limited, offered to provide a major share of the money required and to assist in raising the additional funds, on the condition that the proposed plant be enlarged to produce 45,000 barrels of oil daily.

The revised proposal was recommended by the Oil and Gas Conservation Board and approved by the Provincial Government in April, 1964. Construction started in the fall of that year, working toward a completion deadline of September 30, 1967.

Project Will Cost \$230 Million

Total cost of the project is presently estimated at \$230 million. The Sun organization provided some \$72 million to Great Canadian last year, and has allocated an additional \$90 million for the project this year.

Residents of Alberta are sharing in ownership of Great Canadian through a \$12,500,000 issue of convertible debentures sold during 1965.